CHAPTER ELEVEN

Proliferation

Even in the depths of the Cold War, the United States and the Soviet Union held one interest in common: nonproliferation of nuclear, biological, and chemical weapons. As the Cold War came to an end, however, second and third tier states such as Iraq tested their ability to acquire nuclear, chemical, and biological weapons and missiles to deliver them (NBC/M). The former Soviet Union, once the chief U.S. partner in developing measures to reduce the proliferation of NBC/M, is now a troubling potential source for leakage of NBC/M capabilities. A new black market may be further enabling states to circumvent existing measures to stem proliferation. More than at any other time, states appear to be pursuing NBC/M capabilities, and their incentives to do so are a powerful combination of political, military and economic objectives--making efforts to dissuade and deter acquisition of NBC/M through traditional means ever less effective. Thus it is that the United States is confronted with the likelihood that future regional contingencies will take place in an NBC environment. While this promises to make the next five to ten years a dangerous time, this period may also offer a unique opportunity to turn the tide of this proliferation to make the threatened use of NBC less attractive.

Background and Trends

Why Escalating Proliferation Despite Renewed Norms?

Political Incentives to Proliferate

In the post-World War II era, the United States has maintained a fairly constant set of regional commitments. These commitments were established based on its perceived interests in these regions as well as the anticipated costs of defending those interests. U.S. interests in the Persian Gulf and Far East have been relatively well defined, even within the scope of the Cold War confrontation with the Soviet Union. Even in that context, certain regional states sought tools they hoped would change the regional status quo. With the power vacuum resulting from the end of the Cold War balance of power, these states have increasingly sought to redefine their power relationship vis-à-vis not only their regional neighbors but also the United States--the sole remaining superpower.

The value of NBC/M as a tool for rogue regimes to attain their political goals will remain so long as these weapons are perceived as valuable tools for coercion, and as long as regional states and their allies, including the United States, remain vulnerable. By changing the potential costs associated with defending U.S. interests in these regions, these states appear to have sought to alter the U.S. calculation of interests, to deter U.S. intervention, to seek to break up U.S. coalitions, and perhaps to obtain U.S. renunciation--though conflict or negotiations under threat of conflict--of its defined role in the region.

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Potential NBC/M-armed opponents may also see the threat of use of NBC/M against U.S. coalition partners or allies as a powerful tool in undermining U.S. options for coalition warfare or in seeking through NBC/M coercion to undermine U.S. basing or other support for operations in a foreign theater.

Military Incentives for Proliferation

Unlike the U.S. attitude toward biological weapons, potential adversaries see NBC as a valuable military tool. Each type of weapon has its own effects, but generally the military utility of NBC/M is twofold: changing the conduct of the war through the threat of use; and changing the conduct of the war through actual use.

In the face of a credible threat of use of NBC/M, the United States and its coalition partners must make operational changes which may degrade, but certainly will alter, the preferred mode of operations, i.e., the way the U.S. would conduct operations against an enemy armed only with conventional weapons. States pursuing NBC/M are likely to understand this and seek to use the threat of these weapons to make U.S. operations more difficult and more costly. An example of the military utility of the threat of use of NBC/M is the substantial resources the United States made during Desert Storm in searching for missiles. States thus may value mobile missiles not only for their threat value, but also for their contribution to drawing U.S. forces away from other targets.

During the Cold War, the United States and the Soviet Union appear to have agreed that the deterrent value of nuclear forces was primary. Rogue regimes pursuing NBC/M, while recognizing the potential deterrent value of NBC/M, may also see them as valuable warfighting tools. This may be particularly true if they want to oppose the United States. These regimes may see these weapons as a means of balancing the United States' overwhelming conventional superiority and, through raising casualties dramatically, of undermining the U.S. will to fight.

It is thus possible that in the next regional conflict, NBC/M will be used in war in a battlefield mode. If this is true, it is as likely that they will be used early in the conflict as that they would all be held in strategic reserve. Virtually every stage of U.S. operations is made more complicated by the requirement to operate after the use of NBC/M, beginning with deploying through vulnerable ports and staging facilities. Far from being weapons of last resort, NBC/M may be a weapon of choice for rogue regimes. States are unlikely voluntarily to yield weapons that offer them a force multiplier and means to balance U.S. conventional superiority.

The military incentives to proliferate exist because states currently perceive vulnerabilities to the use of NBC/M that make them worth the financial and political investment in their acquisition and the risk of the consequences of their use. The task for the United States is to deny a potential enemy the benefits it might seek through employment of NBC and increase the risks and costs associated with use.

Economic Incentives to Proliferate

In addition to the political and military value states appear to attribute to NBC/M, regimes apparently are increasingly viewing the development and possession of NBC/M as providing near and long-term economic benefits. States may seek to produce NBC/M and sell these production capabilities or systems for capital or barter for other weaponry. Indigenous production also enables states to avoid the consequences of export controls. Some states, including Iran and India, have touted the spin-off benefits associated with indigenous production of higher technology capabilities. Finally, some states may see production of NBC as a means of extracting money from the western nations. North Korea, for example, has used its NBC/M potential to extract financial infusions from outside sources including the United

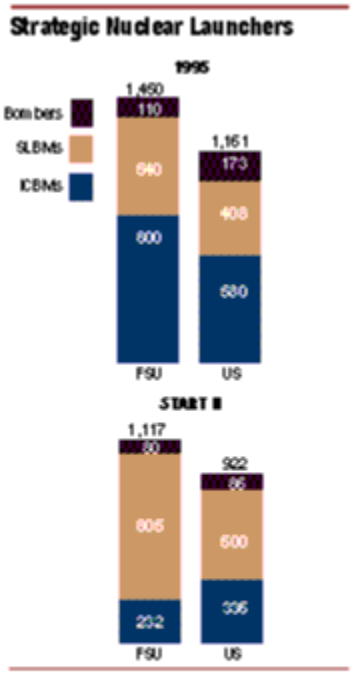
States and Japan.

Current NBC/M Trends

Nuclear Proliferation--A Mixed Record

Nuclear proliferation clearly receives the greatest attention internationally. Some cite the indefinite extension of the Nonproliferation Treaty (NPT) and the signing by many states of a Comprehensive Test Ban Treaty (CTBT) as indicative of a renewal of the international norms against nuclear proliferation. Further evidence of a positive trend against proliferation includes Brazil and Argentina signing the Treaty of Tlatiloco, which mandates a nuclear-weapons-free zone in Latin America; Ukraine, Kazakstan, and Belarus joining the NPT as non-nuclear weapon states; and South Africa's announcement that it had eliminated its nuclear weapons and its nuclear weapons program.

The other side of the ledger, however, is disturbing. Countries with hostile intentions toward the United States, including Iran, are pursuing nuclear weapons capabilities. Many other states, currently not hostile to the United States, have the technical potential to develop nuclear weapons.



Source: International Institute for Strategic Studies, *The Military Balance 1996/97* and Secretary of Defense, *Annual Report to the President and Congress 1995*.

Note: The FSU launchers include 44 bombers in Ukraine. The rest are in Russia.

The perceived value of these weapons is reflected in the often cited statement attributed to former Indian Army Chief of Staff Sundarji: one principal lesson of the Gulf War is that, if a state intends to fight the United States, it should avoid doing so until and unless it possesses nuclear weapons.

Presumably, in the eyes of proliferators, nuclear weapons would serve to coerce and deter the United States from responding to aggression such as Iraq initiated against Kuwait or, at a minimum, would complicate coalition building within and outside the region. North Korea must also perceive enormous value in possessing nuclear weapons, perhaps by threatening Japan in order to deny the United States access or by actually using nuclear weapons against targets such as key ports and airfields in the south. The potential political and therefore military impact of the use of even one nuclear weapon is of such magnitude as to require careful consideration in devising possible responses and defenses.

Biological Weapons--the New Weapon of Choice?

Although often treated as less threatening than nuclear weapons, increased attention is now being given to the biological threat. Many of the Cold War assumptions about the strategic and tactical utility of biological weapons (BW) no longer appear valid. In fact, given the diffusion of the dual-use technologies involved, the pursuit of BW is now recognized as a relatively cheap and easily available path to acquire a weapon of mass destruction--the poor man's atomic bomb. The absence of unambiguous signatures for BW facilities, reducing their vulnerability to attack, only adds to the attractiveness of biological weapons for rogue regimes. Finally, such regimes can hope that the United States and any possible coalition partners would be deterred from attacking a biological or potentially biological weapons facility due to concerns regarding collateral damage.

It is possible for BW agents to inflict massive casualties against soft targets such as cities to an extent

that rival's megaton nuclear weapons. Further, because only small quantities of these highly lethal agents are needed to achieve significant effects, an aggressor can choose between multiple delivery modes and attack options. Moreover, as the number of states engaged in BW research has grown, the sophistication of their work has also grown, leading to technical advances (e.g., microencapsulation to produce more stable agents for use over longer periods) that may permit biological agents and toxins to be used in a more controlled fashion to advance military goals. In fact, while BW can be a weapon of mass destruction, BW can also be used in a more discriminate fashion, for example, against troops and such assets as ships and naval task forces. BW use on the battlefield and against such critical targets as airfields--once considered unlikely because of the delay before some biological agents work and their susceptibility to meteorological and prophylactic factors--may well become a significant threat in the future.

The inability to detect BW at a distance, and therefore to defend effectively against BW attack, further compounds the challenge. While gas masks can be effective against most agents with warning, and while progress has been made in such areas as vaccine research, current defenses cannot reliably protect U.S. forces or civilians. Even planned improvements will only reduce the scope of the problem, not eliminate it. Moreover, the United States has only begun the process of developing strategic and policy responses to the BW threat.

The psychological and strategic impact of the threat or use of biological weapons cannot be itemized, but will likely be extremely significant. Their invisibility combined with the particularly unattractive symptoms highlights their potential impact. Potential allies would need to give grave consideration to supporting the United States in any endeavor that might place their civilian population at risk of BW use. This is particularly true should the U.S. not be able to offer some assistance to defend against the agents.

Chemical Weapons--the Threat Remains

Chemical weapons are currently possessed by more states than either biological or nuclear weapons, and are the only one of the three to be used in the post-World-War-II era. There are significant differences between chemical weapons (CW) on the one hand and BW and nuclear weapons on the other. For example, the lethality of CW is substantially less; a considerably greater quantity of chemical agent is needed to inflict a given level of casualties than for either BW or nuclear weapons. Likewise, significant differences exist in the feasibility of defenses. Although exceptions exist (such as chemical agents developed by the former Soviet Union capable of penetrating gas masks), it is possible to provide high-quality CW defenses, even for civilian populations, at relatively low cost, should the will to do so exist.

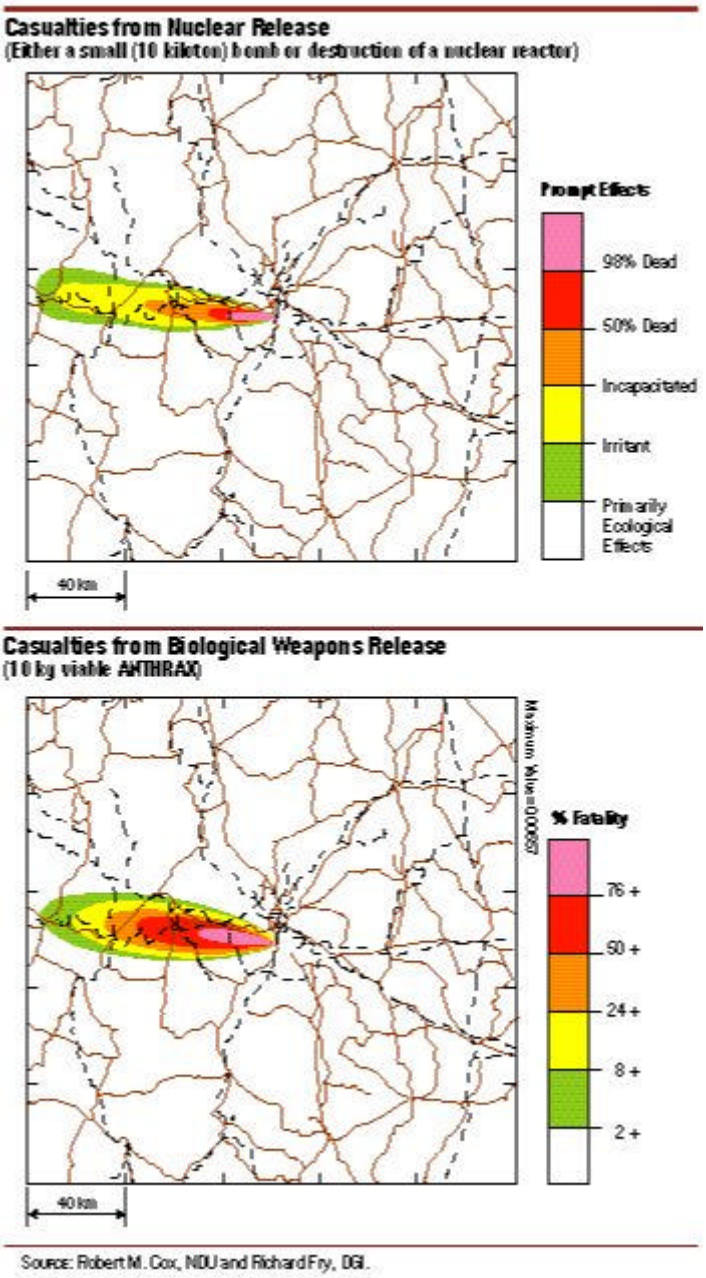
Because of these differences, some experts tend to minimize the potential consequences of CW use, arguing that CW does not merit consideration as a weapon of mass destruction. In fact, analysis suggests that CW use against U.S. and allied forces and critical infrastructure facilities can have a major impact on the outcome of a major regional conflict. Even with early warning, well-equipped and trained forces are likely to take some losses from CW attacks. Such use--or even the threat of use--will have a dramatic effect on performance, particularly if use is prolonged. Finally, the introduction of CW in a conflict will most likely have profound political consequences which will, in turn, have a direct impact on the operation and outcome of the war, raising issues from war aims to the possible use of nuclear weapons in response.

Ballistic and Cruise Missiles--Extending the Threat Ever Further

The majority of NBC proliferators appear to view missiles, and specifically ballistic missiles, as the

delivery system of choice. More than a dozen of these countries have operational ballistic missile programs. Although the ballistic missiles in the arsenals of these proliferators today are, for the most part, limited in range to about 600 kilometers, missiles capable of much longer ranges are being aggressively pursued. For example, Iraq, on its own, was able to increase significantly the range of its Soviet-supplied Scuds. North Korea is actively exporting longer range Scuds, has flight tested the 1,000-plus kilometer No Dong, and has under development a 3,500-plus kilometer missile, the Taepo Dong II. Potential buyers for these Korean missiles are numerous. Similarly, as cruise missile technology becomes widely available (e.g., with the availability of global positioning system technology), cruise missiles will almost certainly become more attractive, offering a low cost but highly effective means of NBC delivery.

At the same time, regional states are more likely than the United States to be creative in designing delivery modes for NBC weapons. Novel delivery modes, if not openly tested, provide a lower confidence in the effect of weapons, but also present the United States with detection and defense challenges.



Potential Flashpoints

Some states have given up their NBC/M capabilities in recent years, but in virtually every case this has been the result of regime democratization. Regime change or other circumstances could lead states to a position in which they conclude, perhaps for a second time, that possession of NBC/M capabilities is in their interest. Given the difficulties associated with proving that a state possesses such capabilities, states could enjoy a significant lead time in perfecting and expanding its capabilities. The following addresses some of the countries currently engaged in proliferation and demonstrates the extent of the problems facing the U.S.

North Korea

The military balance on the Korean peninsula was fairly stable until the North began actively pursuing

its offensive NBC and ballistic missile capability. With these programs, it has sought to extract diplomatic advantage from the U.S., as well as to threaten U.S. forces and allies throughout the region. At the center of this threat is North Korea's aggressive ballistic missile program. North Korea reverse-engineered the 300 kilometer Scud B missile and developed the 500 kilometer range Scud C missile. The No Dong, which reportedly is being funded by Iran and Libya, will have a 1,0001,300 kilometer range. This missile, flight tested in 1993, would allow North Korea to put at risk all U.S. forces in South Korea and most of Japan. According to CIA Director John Deutch, the No Dong is expected to be deployed by the end of 1996.

In addition, Pyongyang is also developing the Taepo Dong I and II. The CIA Nonproliferation Center's March 1995 report indicated that the Taepo Dong I and II will have ranges of several thousand kilometers. Other estimates of the Taepo Dong II's range are even larger. With a 4,000 kilometer range capability, North Korea can target Hawaii and all of Alaska. With a 6,000 kilometer range, it could threaten Seattle, San Francisco, and Los Angeles. Until 1996, the CIA position was that the Taepo Dong I and II missiles could be deployable in 19992001. However, the missile development programs failed to achieve the milestones needed to meet that schedule, and the intelligence community currently estimates slower progress.

North Korea has become a key supplier to other rogue states that have not yet perfected their indigenous ballistic missile production capabilities. North Korea has sold Scuds to Iran and Libya. North Korea has also assisted Iraq and Syria with their missile programs and may be helping other rogue states such as Libya.

North Korea has a chemical weapons (CW) program that, according to the CIA, includes mustard and blister agents. Since the 1960s, it also has had a biological weapons program which, according to the 1996 Secretary of Defense report on the proliferation threat, gives it the capability to produce infectious biological warfare agents and biological weapons. Estimates that North Korea had extracted sufficient fissile material from its illicit nuclear program to manufacture one to two weapons in recent years, mean that North Korea may have the capability to threaten or actually attack U.S. forces or allies with nuclear weapons or with radiological weapons which spread radioactive material.

Iran

Iran possesses an impressive arsenal of ballistic missiles and understands the great political and military utility of these weapons--particularly if their enemy is undefended. The CSS8, provided by China, has a 150 kilometer range. The 300 kilometer Scud B missile, sold to Iran by North Korea, gives Tehran the ability to threaten U.S. forces in the Gulf. The 500 kilometer Scud C, also acquired from North Korea, puts key oil installations and ports under threat of attack. If armed with nuclear, chemical or biological weapons, these missiles, despite their inaccuracy, could present a major threat to U.S. and coalition forces in the area. According to the CIA, Iran is seeking to supplement its existing ballistic missile inventories with the purchase from North Korea of the 1,0001,300 kilometer No Dong. Iran is also, with North Korean and Chinese help, seeking to develop and produce its own ballistic missiles with the objective of producing a medium range ballistic missile to threaten targets to a distance of 3,000 kilometers.

The CIA Nonproliferation Center's (NPC) March 1995 report on the proliferation threat states, "Iran is aggressively pursuing a nuclear weapons capability and, if significant foreign assistance were provided, could produce a weapon by the end of the decade. Tehran is devoting significant resources to its nuclear program."

Iran has had a biological weapons program since the 1980s. While the NPC assessment places this program in the research and development phase, the U.S. Arms Control and Disarmament Agency in 1996 concluded that Iran "probably has produced biological warfare agents and apparently has weaponized a small quantity of those agents."

Iran, itself a victim and user of chemical weapons in its war with Iraq, has made sure that it also has the ability to produce and use chemical weapons. Iran produces a variety of chemical agents, including blister, blood, and choking agents. It has cumulatively produced, at a minimum, several hundred tons of agents to support ground operations and against targets such as ports, airfields, and oil installations throughout the Gulf.

Iraq

Iraq's NBC and missile programs suffered a major setback from its defeat in Desert Storm, with many key facilities heavily damaged or destroyed by U.S. forces and others rendered inoperable through continuous intrusive inspections. Nevertheless, Rolf Ekeus, the director of the UNSCOM UN inspection program, reports that stockpiles of chemical and biological weapons materials remain unaccounted for. Furthermore, he reports that Iraq retains the knowledge and equipment necessary to quickly resume its large scale programs were the inspectors to end their activities.

Iraq may still retain several dozen of the over 800 Scud missiles it bought from the former Soviet Union. Iraq has also saved critical missile production machinery and rebuilt facilities that could be used for Scud-type production. The December 1995 interception of 100 sets of advanced guidance equipment for ballistic missiles on their way to Iraq indicates that Baghdad has not given up its offensive missile program. In fact, it appears determined to improve that capability. While UN sanctions prohibit Iraq from producing ballistic missiles with ranges greater than 150 kilometers, Iraq has been able to focus its missile production efforts on those programs that are permitted within the UN guidelines but which offer the greatest opportunity for range extension.

Baghdad has retained a significant amount of chemical weapons production equipment, which is monitored by UNSCOM. Some chemical weapons production could be resumed in weeks if inspections ceased. Iraq's offensive biological program, which produced thousands of gallons of anthrax bacteria and botulism toxin, is of the greatest concern. Production could begin at any time, were inspections to end.

After years of denying that it had a BW program, Iraq reversed itself in 1995, subsequent to the defection of Saddam's son-in-law Hussein Kamal, who had been in charge of special weapons programs. Iraq revealed to the UN that in the year before the January 1991 start of Desert Storm, a total of 11,800 liters of concentrated botulinum toxin and 8,575 liters of anthrax were produced at Al Hakam, Daura Foot and Mouth Disease Institute, and Salman Pak. Large scale weaponization of BW agents began in December 1990. Iraq filled more than 150 bombs and 50 warheads with agent. All these weapons were dispersed to forward storage locations but then were not used during the war.

Iraq also retains the expertise and technological base to resume its uranium enrichment program, including machine tools and centrifuge designs. Even though Baghdad's nuclear program has been disrupted, its continued deception and evasion on all related issues indicates an intention to resume the quest for nuclear weapons once freed from international sanctions.

Libya

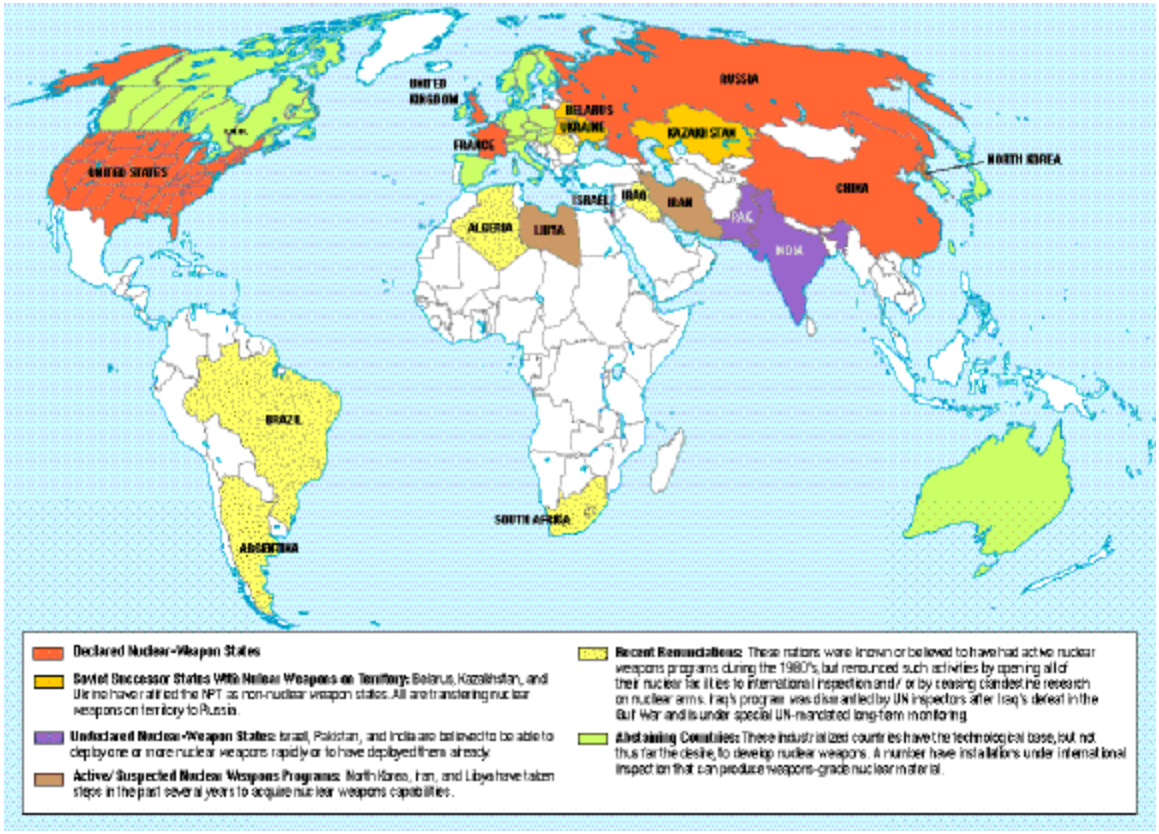
Libya has demonstrated an almost obsessive desire to possess ballistic missiles and chemical weapons. At least in the case of ballistic missiles and chemical weapons, which it has acquired, it has also demonstrated a willingness to use these capabilities. In 1986 Libya fired two Scud-B missiles at a U.S. facility on the Italian island of Lampedusa. Libya is also one of the few nations to have employed chemical weapons in the last decade, having dropped chemical agents from an aircraft against Chadian troops in 1987.

Libya possesses the short range SS21 and the 300 kilometer Scud B. In addition, Libya is reportedly trying to acquire the 500 kilometer Scud C and is continuing to work on developing its indigenous Al Fatah missile, whose range is variously estimated at between 200 and 950 kilometers. Of greater concern than its indigenous program, however, is the prospect of a Libyan purchase of No Dong missiles from North Korea.

While the Libyans reportedly obtained their chemical agents from the Iranians, they have not been satisfied with external sources and have sought an indigenous production capability to supplement their external purchases. Following the fire at the Rabta chemical weapons facility, Libya constructed an underground facility at Tarhuhna which the U.S. is confident is to be used for chemical warfare production. CIA Director Deutch has estimated that Libya has 100 tons of mustard and nerve agent. With regard to acquiring biological and nuclear weapons, Libya's efforts have--thus far--been undermined by its own lack of technical infrastructure.

Nuclear Proliferation 1995

Source: Carnegie Endowment for International Peace, *Tracking Nuclear Proliferation*, 1995.



Syria

Syria is a major missile proliferant in the Middle East with a long track record of seeking to obtain weapons of mass destruction and ballistic missiles to deliver them. Syria has deployed FROG7 and Scud-B surface-to-surface missiles acquired from the Soviet Union shortly after the October 1973 War. In the 1980's, the Soviet Union supplied Syria with the more accurate and longer range SS21 (120 kilometer). North Korea has reportedly sold Syria 24 Scud-PIPs, an indigenous, more accurate variant of the Scud-B which carries a 700-kg payload to a range of approximately 500 km. Syria reportedly took delivery on 24 missiles and 20 mobile launchers in March 1991, and may have received additional missiles and launchers since then. It appears that China is transferring M9-related components and technology to Syria that will allow the Syrians to assemble their own missile, which will have

a range of 600 km. Syria is reportedly developing indigenous missile production capabilities with North Korean and Chinese assistance at facilities in Aleppo and Hama.

Syria has complemented its ballistic missile efforts with efforts to obtain chemical and biological munitions to arm them. The Arms Control and Disarmament Agency has reported that it is highly probable that Syria is developing an offensive biological warfare capability. Syria has reportedly developed the capability to produce both mustard gas and nerve agents and to arm its surface-to-surface missiles with chemical warheads.

U.S. Interests and Approach

Net Assessment

The past decade has witnessed some limited proliferation successes. Three states of the former Soviet Union, Argentina, Brazil, and South Africa all appear to have given up their nuclear weapons programs or capabilities. International legal norms regarding proliferation are being reinforced.

Despite these positive steps, however, the evidence indicates that international legal obligations and norms are inadequate to address the proliferation problem. States have apparently assessed that the political, military, and economic incentives to proliferate outweigh any costs perceived in going against these norms.

The NBC/M threat could radically alter the way the United States thinks about and plans for force composition, forward presence, force projection, and the conduct of combat operations. Given the range of U.S. and coalition vulnerabilities, the multitude of potential adversaries, and the many delivery methods available for the employment of NBC, the spectrum of plausible scenarios for the use of NBC is wide and varied. Based on an examination of a series of such scenarios, the NDU Center for Counterproliferation Research (CCP) has concluded:

- The increasing utility of unconventional delivery will require a fundamental reassessment of how the United States defends against the NBC threat.
- The growing prospect of use (or threat of use) early in a conflict will require major changes to U.S. doctrine, force design, planning, and training.
- The expanding capability for long-range delivery will deny the United States a homeland sanctuary, making essential both missile defense and emergency response capabilities.
- The unique challenges NBC weapons pose for coalition warfare will affect the way the United States conducts war.
- Biological weapons will become weapons of choice.
- Deterrence is becoming a two-way street. Traditional deterrence based primarily on punishment and retaliation will become problematic, requiring a strategy of deterrence by denial.

U.S. Interests

Protect Americans from NBC/M attack

The principal U.S. interest regarding proliferation is to protect the U.S. and Americans from NBC/M attack. While there is small prospect in this decade that a proliferant will acquire missiles with which to attack the continental U.S. with NBC weapons, attack by unconventional delivery means, such as terrorism, is possible. Furthermore, U.S. forces abroad are vulnerable.

Preserve Stability in Crucial Regions

Proliferation of NBC/M weapons can undermine stability in regions crucial for the security of the U.S., such as the Persian Gulf or Northeast Asia. The U.S. is particularly interested in ensuring that its allies are not targeted by NBC/M weapons in the hands of rogue regimes.

Interests Not Always Consistent with Counterproliferation

The United States' efforts to stop and reverse proliferation often come in conflict with other valid U.S. interests, including:

- Diplomatic interests. The U.S. has an interest in maintaining good relations with important states, which may at times engage in behavior that the U.S. judges is not helpful from a counter-proliferation perspective. For instance, Russia is constructing a nuclear power plant in Iran despite U.S. objections, and Washington has not judged this issue sufficiently important so as to endanger U.S.-Russian relations.
- Commercial interests. The export of U.S. goods and services are sometimes constrained by either U.S. prohibitions on exports of items that could be useful in another state's proliferation or by sanctions or other limitations on trade imposed as a means of enforcing U.S. proliferation policy. For instance, the U.S. trade embargo with Iran, imposed in part because of proliferation concerns, cuts the U.S. out of that potentially lucrative market.
- Arms control interests. U.S. efforts in pursuit of arms control and nonproliferation related agreements have often put constraints on U.S. military programs that might support or be essential for defense against or deterrence of NBC use, as in the case of the ABM Treaty, a Comprehensive Test Ban Treaty (CTBT), and the Chemical Weapons Convention (CWC).

U.S. Approach

Diplomacy and Dissuasion

Since the dawn of the nuclear era, the United States has demonstrated its continuing interest in limiting proliferation. For example, the U.S. has led efforts to eliminate biological weapons since the late 1960s, being a sponsor with the Soviet Union and Britain of the 1972 Biological and Toxin Weapons Convention. In addition to U.S. support of the 1925 Geneva Protocol which bans the use of chemical weapons in war, the U.S. led in developing and implementing export controls to diminish the ease with which states manufacture chemical weapons and led international efforts to negotiate an agreement to ban the possession and production of chemical weapons, the CWC. The United States also led the effort to constrain the export of ballistic and cruise missiles or the capability to manufacture missiles with parallel unilateral constraints under the Missile Technology Control Regime.

Arms control and proliferation agreements have worked with states inclined to act consistent with the

rule of law. However, arms control treaties may be perceived by rogue states as a means of cover and concealment for their NBC/M programs. For instance, Iraq was not found to be guilty of any wrongdoing by the IAEA prior to 1991--despite the fact that it was quite close to developing a nuclear weapon.

Besides arms control treaties, other instruments of diplomacy and dissuasion designed to persuade states not to choose the proliferation path have been the establishment of alliances and regional balances of power supported by U.S. security guarantees that enable a state that exists in a dangerous region to forgo NBC/M. For instance, the U.S.-Japan security alliance played an important role in reassuring Japan that it need not develop nuclear weapons, much as NATO did with respect to Germany.

Deterrence

In the event that a rogue regime acquires NBC weapons, deterrence is clearly the first and preferred line of defense. Many of the assumptions on which U.S.-Soviet deterrence was founded may or may not hold with rogue regimes. For example, the United States ascribed a basic and shared rationality to Soviet leaders. However, regional states motivated by messianic anti-western zealots or by regime survival may well act differently. Another difficulty in articulating a regional deterrence strategy is the complexity of the potential uses of these weapons, especially biological weapons; for instance, they could be used surreptitiously against urban centers. In addition, it is difficult to determine how such weapons are viewed by potential users in a way that makes it possible to develop deterrent and retaliatory responses.

Conventional superiority may well be able to deter NBC use in most cases, particularly as conventional weapons become capable of extracting destruction comparable to or greater than weapons of mass destruction, and if the U.S. deploys active and passive defenses. However, it is not certain that U.S. conventional forces will be successful in all circumstances. Moreover, a potential adversary is likely to assess the political-military equation differently than the United States, and it is their perception that is key to deterrence.

Missile Defense Systems

PAC 3 (Patriot Advanced Capability): Point or limited-area defense system. PAC 3 improvements include upgrades to radar and an improved hit-to-kill missile known as ERINT. Operational prototype in late 1990s.

THAAD (Theater High-Altitude Area Defense): Ground-based theater missile defense (TMD) system that will provide a wide-area defense capability by intercepting longer-range theater-ballistic missiles at higher altitudes and at greater distances. Provides upper-tier defense to complement point defense, such as Patriot. Several emergency-use batteries in 1998; fully operational in early 2000s.

Navy Lower Tier (AEGIS/SM–2 Block IVA): Could provide tactical ballistic-missile defense capability similar to PAC 3 from the sea. Full deployment in 2001.

Navy Upper Tier: Could provide extensive theater-wide protection, intercepting theater ballistic missiles outside the atmosphere as well as in the ascent and descent phases. If selected, available in early 2000s.

Corps SAM/MEADS (Medium Extended Air Defense System): Mobile lower-tier missile-defense system designed to protect moving combat forces against theater ballistic and cruise missiles. To be developed in cooperation with France, Germany, and Italy. Available in 2005.

Boost Phase Interceptor: An interceptor fired from an aircraft to shoot down a ballistic missile during the missile's booster phase when it is most vulnerable. In concept exploration as of 1996; available at the earliest in 2005.

Therefore, under some circumstances, U.S. nuclear weapons will play an important role in deterrence. One consideration regarding the role of nuclear weapons in deterring NBC use is proportionality. If a nuclear response is perceived as totally disproportionate, it could lack credibility. While a nuclear response may be seen as credible in retaliation for use of nuclear or biological weapons against urban populations, such a response could be seen as less credible if initial use is confined to the battlefield. The Gulf war experience may be instructive in this regard. Iraq--after having taken measures to fill bombs and Scud warheads with BW and CW agents--did not employ these weapons, even as it was being overwhelmed on the battlefield. Although it is impossible to know with confidence why Iraq did not use its CW and BW, revelations by the Iraqi leadership indicate that Iraq's decision was based on the fear that the United States would retaliate with nuclear weapons in the event of a BW or CW attack.

How the United States can best deter NBC use will differ region by region, country by country. In developing regional deterrent and defense strategies, it is essential to understand the military, political,

and cultural dynamics which are critical in identifying which assets should be held at risk for deterrent purposes. It is also essential to determine how best to communicate intentions, both public declaratory policy as well as private communications and non-verbal messages to demonstrate resolve.

Until the United States can ensure that it can defend against NBC/M with a high degree of confidence and prevail militarily even if NBC/M is threatened or used, states will maintain a strong military and political incentive to acquire, threaten, and perhaps to use NBC/M. So long as the incentive to acquire these weapons exists, there will also remain powerful economic incentives to possess them. States who seek to deter the United States or would seek the demise of America as a world leader may reason that until the U.S. possesses the capability to defend against NBC attacks, it can be forced to choose between pre-emptive strike, physical or political withdrawal, and the threat of nuclear retaliation. These pose politically, legally, militarily, and morally difficult choices.

Military Means

If it is to deter the use of NBC weapons, or to defend itself and its coalition partners against NBC attacks by rogue states, the United States must continue to develop core military competencies suited to operating in an NBC environment. These run the gamut of military capabilities, and include doctrine and training adjustments; deployment of active and passive defenses; deployment of forces which can eliminate the rogue's NBC weapons; and intelligence and analysis capabilities.

Doctrine and training. One of the areas where immediate improvement can be made is in doctrine and training. Joint NBC doctrine is in its infancy. The services have only begun to come to grips with the operational consequences of an NBC-armed adversary and methodologies for assessing the operational impact of NBC use against U.S. forces remain inadequate. A key requirement is to understand an adversary's likely NBC employment concepts--which are likely to differ from Soviet plans to use NBC weapons to achieve mass destruction.

Active and passive defense Largely through the efforts of the U.S. Army Chemical Corps and the requirement to fight in a chemical environment if war broke out in Europe, U.S. forces have long familiarity with chemical weapons. However, while new, lighter suits will mitigate this condition somewhat, soldiers operating for long periods in chemical protective gear exhibit sometimes severe degradation in capabilities. Large scale targets--like ports and airfields--are inviting targets for CW and BW. This imposes requirements to have both adequate active missile defenses to shield these fixed targets as well as large scale decontamination capabilities so targets that are struck can be operating as quickly as possible.

Should the United States possess robust active and passive defenses, the value to potential adversaries of their nuclear, biological and chemical weapons, and the most threatening means of their delivery, ballistic missiles, would be significantly degraded. Such degradation could persuade an adversary that use of NBC/M, given significantly diminished effect, is not worth the potential cost that could be associated with a response to an NBC/M attack. The deployment of active and passive defenses offers some possibility, therefore, of turning the tide of proliferation even among states currently hostile to the United States.

The Department of Defense currently has a number of theater missile defense programs. The question of future directions for ballistic missile defense and U.S. ability to deploy robust systems to meet an increasingly threatening range of ballistic missile capabilities is currently being addressed within the context of the 1972 ABM Treaty which prohibits the United States from deploying ballistic missile defense beyond 100 interceptors which could be deployed in accordance with the ABM Treaty. While it

is hoped that the Clinton Administration's new ABM Treaty-related agreements with the states of the former Soviet Union will lead to restraint by Russia with regard to its strategic offensive forces, continued U.S. compliance with the Treaty will put an upper limit on the capability of the antiballistic missile systems the United States can use to defend its territory, forces and allies.

Forces to strike NBC targets. Successful deterrence and defense requires not only the ability to operate in a chemical or biological environment, but also the ability to hold at risk--and destroy if needed--an adversary's NBC forces. Potential enemies have learned from the Gulf War both to be mobile and to locate key targets underground. Mobility and hardness constrain the U.S. ability to destroy NBC targets. Given the problems identifying and then hitting these targets, it would be difficult to have confidence that the U.S. had destroyed a rogue regimes' NBC targets. This seriously diminishes the attractiveness of preemptive strikes on NBC targets, which in any case would be problematic because of the potential for adverse international reaction.

Intelligence and analysis. The proliferation of NBC has put special pressures on intelligence and analysis. The margins for acceptable variance and error in estimates are smaller than for conventional capabilities while the difficulty of developing and delivering acceptable estimates is far more difficult.

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